Plant Archives Vol. 19 No. 1, 2019 pp. 989-992 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

THE EFFECT OF PARTIAL REPLACEMENT OF RAPESEED MEAL INSTEAD OF SOYBEAN MEAL ON SOME GROWTH PARAMETERS OF COMMON CARP, *CYPRINUS CARPIO* L.

Dhilal M. Halbos, Maryam J. Mohammed and Hassan A. Fazaa

Department of Animal Production, College of Agriculture, University of Al-Muthanna, Iraq.

Abstract

This study was conducted to knowing the effect of partial replacement of rapeseed meal instead of soybean meal on some growth parameters of fish which reared in the floating cages, the experiment including 3 treatments T1(25% rapeseed meal), T2 (20% soybean meal and 5% rapeseed meal) and T3 (15% soybean meal rapeseed and 10% rapeseed meal), six floating cages were used in this experiments which made of galvanized iron–sized 4 cubic meter, the current study showed the best growth parameters achieved in some treatments which the partial replacement of rapeseed meal instead soybean mealoccurred in it so we can conclude that the partial replacement processes in common carp diets gave the highest rates of growth parameters.

Key words : Common carp, Rapeseed meal, Partial replacement.

Introduction

Lysine and Methionine considered as important essential amino acids which presence in fish meats, as well as nutrients as phosphor, B vitamin and iron that make it's healthy and high nutritional value meat because it helped to reduce cholesterol levels due to the presence of unsaturated fatty acids (Mathiesen, 2012). Qusay *et al* (2013) pointed at recent days there was a shortage in forage quantities which used for animal feeding generally that make a lot of animal breeder to finding alternative feeds as well as the expansion and increase of livestock breeding projects and increase forage prices that increase the desire and research to finding alternative of the animal feeding.rapeseed crop considering from fodder, which introduced for animal feeding because, it contains a high amount of oil (Akram, 2000). Al-Jubouri (2005) mentioned a rapeseed has advantages make it from the forage, which we can depend on it in animal feeding, the most important of these advantages its meal is cheap and palatable as well as abundance of its production and it contain a little amount from uric acid that makes it more suitable food for animal without any side effects as well as it contains 37% crude protein (Murdock, 2001). Raymer (2002) mentioned that the rapeseed oil from the most oils, which used in the human feeding because of its little content from saturated fats that amount to 5-8%. Rapeseed crop of winter crops, which grown in Iraq and entered within the agricultural plan by the agriculture ministry because It has entered into food and feeding of animal (Al Enezi, 2004). Mawson (1994) pointed that the little content from glucosinolate in rapeseed meal makes it from the suitable meals for digestion process in the animal. The current study aimed to know the effect of partial replacement of rapeseed meal instead soybean meal in some growth parameters of common carp fish.

Materials and methods

This study was carried out in the Euphrates river in Al-Muthanna province, Al-Samawah city, (6) floating cages were used in this experiment with dimensions length 2 m × 2 m width × 1 m height and the floating cage region was located in the left side of the river (Al Bandar region), which is lies about 6 Km from the center of Al-Samawah city. Mechanical feeders was used which is made of galvanizing iron in fish, eye shaped nets (about 20 mg) was set up on the sides of cages and (120) common carp fish had brought from Al-Rumaitha hatchery then the fish distributed on (6) cages as (20) fish per

cage with two replicate to ach treatment, the fish weight ranged from (23-25 gm), some daily work was done as clean the surrounding areas of the cages from waste and the dirt that is washed away by the river during continuous flow and looking continuously to movement of fish and ensure the safety of the nets and it not being torn . weight were measured by fishing number of fish at least 50% of the basic number which existing in each cage and the weighting process was conducted every (15) day, the environmental measurement were recorded weekly from temperature, pH, Do and salinity and the experiment lasted for (3) months to duration from 1/10/2018 to 1/1/2019, the complete randomize design (CRD) was used in this experiment and the data were statistically analyzed by used SPSS and the means were compared by using the Duncan test (Duncan, 1955).

Energy was calculated as Philipose *et al.* (2012) mentioned as following :

The Gross energy = % Protein × 5.56 + NEF% × 4.45 + Fat% × 9.2

The growth parameters

The total weight gain, food conversation rate and food conversation efficiency were calculated according to Philipose *et al*. (2013) :

Weight gain (gm/fish) = Final weight mean – Initial weight mean

Food conversation rate = Food intake / wet weight gain

Food conversation efficiency = wet weight gain / Food intake × 100

The relative growth rate was calculated according to Keremah and Ockiya-Alfred (2013).

Relative growth rate = Final weight mean(gm/fish) – Initial weight mean(gm/fish)/Initial weight mean (gm/fish)

Protein efficiency ratio = wet weight gain (gm) / protein intake (gm)

Water environmental measurements

Temperature : The temperature was recordeddaily at midday by mercury thermometer gradual from 0-50 degree.

Salinity : Samples were taken from each cage weekly and then the tests were done in the laboratories of the soil department, Agriculture college, Al-Muthanna University by EC meter (Hanna company).

Dissolved oxygen : Dissolved oxygen values were recorded weekly from each cage to knowing dissolved oxygen concentration inside each cage by using a device which produced by the English company Jenway.

Table 1 : The percentage of diet components of the three treatments of the experiment (100%).

Feed stuff	T1 (Control)	T2	T3
Fish meal (protein concentrate)	20	20	20
Soybean meal	25	20	15
Rapeseed meal	-	5	10
Maize	15	15	15
Wheat bran	10	10	10
Barley	30	30	30

Table 2 : The chemical analysis of the diet of the three treatments of the experiment (100%).

The component	T1%	T2%	T3%
Protein	30.04	30.04	29.68
Fat	2.88	3.12	3.36
Ash	7.83	7.78	7.73
Crud Fiber	4.37	4.8	5.23
Moisture	8.11	7.99	7.88
NEF	54.88	54.26	54
Gross energy	437.72	437.17	436.23

pH value : The water samples were taken from each cage weekly to making the testing in the laboratories of the soil department, Agriculture college, Al-Muthanna University by pH meter (Hanna company).

Results and Discussion

Water testing

During experiment period water temperature ranged from (17.89-26.46^{0}C) as showed in table 3 and this range considering within permissible limit of fish rearing (Peteri, 2006), whereas the dissolved oxygen were recorded the values (8.19-9.16 mg\L) and its within the normal limits and it was noted the inverse relationship between temperature and dissolved oxygen ratio and this may be due to decrease the ability of water to keep oxygen molecules at high temperatures (Abdul Hamid, 2009), pH values were ranged from (7-8.10) these recorded values were within permissible limits in fish rearing (Al-Salman, 1990). Table 3 showed the salinity values were within normal limits in fish rearing and ranged from 1.7-1.8 gm/L).

The growth parameters

The result of statistical analysis showed there is a significant differences in the means of initial weight of different treatments of the experiment at probability level ($p \leq 0.05$) (table 4), whereas a significant differences at probability level ($p \leq 0.05$) in final weight means of

Table 3 : The averages of temperatures, pH, dissolved oxygen and salinity of floating cages waters – Euphrates river.

Year	Months	Temperature (°C)	Dissolved oxygen (Mg\L)	pH	Salinity (L/gm)
2018	October	26.46	8.19	7.00	1.8
2018	November	21.98	8.56	8.8	1.8
2018	December	17.89	9.16	8.10	1.7

Table 4 : The Initial weight and final weight (Mean±Standard error) for fish of different treatments during the months of the experiment.

Weight	Treatments		
	T1	T2	T3
Initial weight(fish/gm)	23.12 a±1.16	23.78 a±1.2	25,08 a±1.25
Final weight (fish/gm)	71.33 c ±1.26	92.74 b ±1.74	103.11 a ±2.31

The different letters in the same line indicate to presencesignificant differences at probability level ($p \leq 0.05$)

Table 5 : The growth parameters (Mean±Standard error) for fish of different treatments during the months of the experiment.

Growth parameters	Treatments		
	T1	T2	T3
Weight gain(gm\fish)	48.21 c ±1.17	68.96 b ±1.75	78.03 a ±1.71
RGR(%)	208.52 c ±7.2	289.99 b ±7.95	311.12 a ±8.26
FCR	3,45 b ±0.12	2.48 a ±0.14	2.31 a ±0.12
FCE(%)	28.96 c ±1.06	40.29 b ±1.66	43.21 a ±1.68
PER	0.96 c ±0.001	1.34 b ±0.007	1.44 a ±0.008

The different letters in the same line indicate to presencesignificant differences at probability level ($p \leq 0.05$).

experimental treatments as T3 exceeded significantly on other treatments and recorded a final weight attained 103.11 gm / fish followed by T2 which recorded a final weight attained 92.74 gm / fish, which exceeding on T1 which attained 71.33 gm / fish. The result of the current study referred to that the higher means of final weight were recorded to T2 and T3 whereas T1 recorded the least mean of final weight parameter and from the results of final weight we noted the treatments that soybean meal has been partially replaced with rapeseed recorded the highest final weights when the percentage of replacement increasing that leads to increasing in final weight means the reason maybe due to increase the amount of unsaturated fatty acids in rapeseed meal which plays a big role to increasing fat content in the meat of fish (Ajuyah *et al*., 1991), the amount of unsaturated fatty acid Linoleic in rapeseed meal is larger than its amount in soybean meal (Lichovnikova, 2002) and with the increasing of partial replacement ratio in the T1 and T2 diets of current study that led to increasing the percentage of Linolic acid and which led to a balance in the fatty acids ratio and the optimum utilization of fat amounts which increase the final weight means of T2 and T3.

The result of the current study showed there were a significant differences ($p \leq 0.05$) of weight gain means of the three treatments (table 5). T3 recorded the highest mean in weight gain mean attained 78.03 gm/fish, which significantly exceeded on other treatments and T2 recorded weight gain mean attained 68.96 gm/fish, which significantly exceeded on T1, which recorded a mean attained 48.21 gm/fish, these results were similar to the result of final live weight means, which it normal reflection to the final weight parameter so the treatments with higher final weight exceeded in the weight gain parameter this result agreed with Al-Zaidy (2011), who found a significant exceeding to the weight gain of the broiler when he fed it on higher level from rapeseed meal.

The results of the relative growth rate (RGR) were similar with result of final weight rate because of the RGR means depending on final weightmean of the treatment and the table 5 confirmed presence a significant differences between the three treatments of the RGR, the three treatments recorded means of the RGR attained (208.52, 289.99, 311.12) respectively and the result of the RGR referred to exceeding of treatments which the partial replacement process of rapeseed meal instead of soybean meal had conducted on its as a result of weight gains which achieved during this experiment which came from the properties that the rapeseed owned as the optimum utilization of fats and the amount of minerals that the rapeseed contain it which exceeding the ratio of minerals in the soybean meal (Ensminger, 1990).

There was no significant differences between T2 and T3, which recorded a food conversation rate (FCR) attained (2.31-2.48) respectively which its significantly exceeding on T1 which recorded a mean of FCR attained 3.45the results of FCR were similar with other parameters results to confirm the exceeding the treatments which the partial replacement process of rapeseed meal instead of soybean meal had conducted on it and agreed with Mohamed (2006), who found exceeding on the FCR who observed an increase in the food conversion rate as the level of rapeseed increased in the animal food diet.

Table 5 showed a significant differences between the three treatments of the food conversation efficiency

(FCE) the three treatments recorded means attained (28.96, 40.29, 43.21) respectively and the results confirmed the exceeding of FCE of T2 and T3 on T1 and these results were similar with FCR results to confirmed the exceeding of the treatments, which the partial replacement process was conducted on it as for protein efficiency ratio the result in the table 5 showed a significant differences ($p \leq 0.05$) between the three treatments which recorded means attained (0.96, 1.34, 1.44) respectively, these results to confirmed the exceeding of PER in all treatments which contain a different level from rapeseed meal, whereas T1 recorded the lowest means of this parameter, which did not contain rapeseed meal in it diet and what was achieved by T2 and T3 of the increasing in the PER considerable a positive reflection to what was achieved by these treatments of a significant differences on other growth parameters as weight gain and relative growth rates and there is a positive relationship between the weight gain and PER (Al-Bahadli, 2011).

References

Abdul Hamid, A. A. M. (2009). Scientific foundations of fish production and rearing. Daralnasher for Egyptian universities. Al-Mansoura Arab Republic of Egypt, 644p.

Ajuyah ah, A. O., H. Lee, R. T. Harding and J. S. Sim (1991). Changes in the yield and in the fatty acid acomposition of the wholecarcass and selected meatporfion of broiler chickens fell. *Fat Oil Seed Poultry Sic*., **70** : 2304–2314.

Akram, M., M. L. Kham, A. Tariq, H. Ahmed and R. Firdous (2000). Effect of digestarcom, Aherbal feed additiveon the performance of broiler chicks fed different levels of rapeseed cake. *Pakistan veterinary_journal* (Pakistan), **20(2)** : 93–96 .

Alanazi, A. F. (2004). Effect of using different levels of rapeseed oil and meal on broiler performance. *MSc thesis*. Agriculture College, Al-Anbar University.

Al-Bahadli, R. H. T. (2011). Stocking different fish densities from common carp *Cyprinus carpio* L. in the floating cages in the marshes of Missanprovince. *MSc. Thesis*. Agriculture College, Baghdad University. 59 p.

Al-Jubouri, F. M. A. A. (2005). The effect of partial replacement of rapeseed meal instead soybean meal in the Coturnix quail diet on the economic and egg quality. *MSc. Thesis*. Agriculture College, Al-Anbar University .

Al-Salman, M. H. M. A. (1990). The basics of fish breeding and production.Dar Al-Hikma for printing and publishing –Al-Mousel.392p.

Al-Zaidy, K. J. L. (2011). Study the effect of sex and partial replacement of rapeseed meal replaces soybean meal on some biochemical characteristics and chemical composition of chicken meat. *AL-Qadisiya Journal For Agriculture Sciences*, **1(1)**.

Duncan, B. D. (1955). Multiple range and multiple F-test. *Biometrics*, **11**: 1-42.

Ensiminger, M. E. (1990). Feeds and nutrition. The Ensimingerpuplishingcompany. 648 west sierra Avenue.

Keremah, R. I. and J. F. Alfred-Ockiya (2013). Effects of dietaryprotein level on growth and body composition of Mudfish, *Heterobranchus longifilis* fingerlings. *African Journal of Biotechnology*, **12(9)**: 971-975.

Lichovnikova, M. (2002). The use of extruded rapeseed feed in Layersnutrition, Mendel University of Agriculture and for esfrybrno, Doctoral thesis, p177.

Mathiesen, A. M. (2012). The state of world fisheries and aquaculture world review of fisheries and aquaculture. Food andAgriculture Organization of the United Nation, Rome, Part **1**: 207 p.

Mawson, R., R. U. Heaney and Z. H. Z. Danezyk (1994). Rapeseed meal_glacosinolates and their nutritional effects. Part III. Animal growth and performance. *Nehrung*, **38** : 167_177.

Mohamed, I. B. M. (2006). Effect of replacement rapeseed meal instead soybean meal on some fatty acids of abdominal fats and sensory characters of broiler carcasses. *Journal of Tikrit University for Agriculture Sciences*, **6(2)**.

Murdock, L., J. Herbek and S. K. Rggins (2001). Canala production and manage ement ID.114.

Peteri, A. (2006). Inland water Resources and aquaculture service (FIRI) Cultured aquatic species information programme *Cyprinus carpi*.

Philipose, K. K., S. R. K. Sharma, J. Loka, D. Divu, N. Sadhu and Dube (2013). The culture of Asian Seabream (*Latascal carifer*, Blocch) in open sea floating net cages off karwar, South India. *Indian Journal Fish*., **60(1)**: 67-70.

Raymer, P. L. (2002). Canala An emerging oilseed crop. In : Janic K and A. Whipkey (eds). *Trends in new crops and new uses*, AsHs press. Alexandria. VA. P. 122_1126 (2002).

Shams Al-dain, Q. Z., E. A. Al-Rawi, H. A. Slamin and Y. I. Hamad (2013). Study the effect of replacement percentages of remnants of sesame industry in the production performance and some body measurements of Awassilambs. *Al-Basrah Journal for Agricultural Science*, **51(2)** : 1, 5-42.